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IS 15739 (2007): Freight containers - Refurbishing - Guidelines [TED 12: Freight Containers and Pallets]

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भारतीय मानक

# भारवाही कन्टेनर — पुनर्नवीयन — दिशानिर्देश

Indian Standard

# FREIGHT CONTAINERS — REFURBISHING — GUIDELINES

ICS 55.180.10

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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**Price Group 2**

Freight Containers and Pallets Sectional Committee, TED 12

## FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Freight Containers and Pallets Sectional Committee had been approved by the Transport Engineering Division Council.

Refurbishment is often referred to as reconditioning, while in fact, in reconditioning there are two distinct operations. One is primarily of inspection and performance evaluation to determine repairs necessary prior to refurbishment. The other operation consists of surface preparation, selection and application of paint, drying, re-marking and reporting to the owner.

The purpose of refurbishment is to bring a container as nearly as possible to new container condition. The goal of refurbishment process should be to obtain a minimum of four years additional service without further major repairs. Any component which does not appear to last four years after abrasive blasting and refurbishment should be replaced.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

# *Indian Standard*

# FREIGHT CONTAINERS — REFURBISHING — GUIDELINES

## 1 SCOPE

**1.1** This standard provide guidance to industries engaged in refurbishing of containers so as to enable them to make safe, efficient and economical containers.

**1.2** Guidelines for the repair of containers before refurbishing is covered in IS 15734 : 2006.

## 2 REFERENCES

The following standards contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

| *IS No.* | *Title* |
|---|---|
| 101 | Methods of sampling and test for paints, varnishes and related products: |
| (Part 1/Sec 3) : 1986 | Test on liquid paints (general and physical), Section 3 Preparation of panels (*third revision*) |
| (Part 5/Sec 1) : 1988 | Mechanical test on paint films, Section 1 Hardness tests (*third revision*) |
| (Part 5/Sec 2) : 1988 | Mechanical test on paint films, Section 2 Flexibility and adhesion (*third revision*) |
| (Part 5/Sec 3) : 1999 | Mechanical tests, Section 3 Impact resistance (*fourth revision*) |
| (Part 6/Sec 1) : 1988 | Durability tests, Section 1 Resistance to humidity under conditions of condensation (*third revision*) |
| (Part 6/Sec 5) : 1997 | Durability test on paint films, Section 5 Accelerated weathering test |
| 6566 : 2001 | Series 1 Freight containers — Classifications, dimensions and ratings (*third revision*) |
| 6569 : 2004 | Freight containers — Vocabulary (*third revision*) |
| 13288 (Part 1) : 1993 | Series 1 Freight containers and testing specification: Part 1 General cargo containers for general purposes |
| 15734 : 2006 | Freight containers — Repair before refurbishing — Guidelines |

## 3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 6569 shall apply.

## 4 PRE-REFURBISHMENT INSPECTION

**4.1** Each container shall be carefully inspected prior to commencement of refurbishment so as to determine suitability for refurbishment. The details of containers not found suitable shall be reported to owner before commencing repair or abrasive blasting.

**4.2** All containers which cannot be refurbished for full service should be rejected.

## 5 REPAIRS

All repairs before refurbishing shall be done in accordance with IS 15734 : 2006 ensuring thereby all dimensions of container are within the sizes and tolerances specified in IS 6566 and IS 13288 (Part 1).

## 6 SURFACE PREPARATION

### 6.1 Preparation

Prior to abrasive blasting, all door hinge pins, bushings and door gaskets should be protected (masked) with a suitable material so that these are not damaged or their operation gets adversely affected as a result of abrasive blasting. All moisture, oil and/or grease be removed prior to commencement of blasting.

### 6.2 Abrasive Blasting

The entire exterior surface of the container is to be abrasive blasted using steel grits, crushed slag or quartz sand at a compressed air pressure of 6-7 kg/cm$^2$ to produce a near white surface finish. When wet sand blasting is used, chromate or other rust preventives shall be used with the water to prevent rusting. Examples of some rust inhibitors are given here under 2 percent by weight solution of any of the following:

a) Chromic acid;
b) Sodium dichromate;
c) Sodium chromate; and
d) Potassium dichromate.

### 6.3 Surface

Upon completion of the abrasive blasting, the metal shall

1—122 BIS/ND/07

have a surface profile (ridge to valley profile height differential) of between 25-35 microns, unless otherwise specified by the supplier of the protective coating. As a result of blasting, the thickness of metal at any location, especially the sides, ends and roof panels shall not be reduced by more than 5 percent.

### 6.4 Residual Grit

Immediately upon completion of blasting, all traces of abrasive materials should be removed from the surface of the container, the interior and any recessed areas, with dry-air stream at high pressure. Such air-stream should be free from moisture and oil.

### 6.5 Pin Holes

On completion of cleaning as mentioned in **6.4** the container should be subjected to light leak test to determine whether any pin holes or damage have developed during blasting.

## 7 PRIME COAT

**7.1** The containers shall be completely primed with approved coating system within 1 h after blasting. A shorter period may be necessitated under certain atmospheric conditions.

### 7.2 Prime Coat Application

The prepared surface should be coated with corrosion inhibiting primer as approved by the owner and meeting the following requirements.

a) Application : By means of airless or conventional spray equipment or brush or roller for small areas

b) Application temperature : 4°C to 38°C

c) Appearance when dry : Flat or matt. Gloss of dry coat should not exceed a reading of 12 at 60° specular gloss

d) Drying time : Dry to touch : 30 min
Dry for top coating 1-8 h at 10°C to 18°C and up to 85 percent relative humidity

e) Flash point closed cup : 27°C, *Min*

f) Shelf life : 9 months, *Min*

g) Pot life : 8 h at 27°C, *Min*
24 h at 10°C

h) Weldability : With dry film of paint the material must be capable of being welded without emission of toxic fumes and without formation of heavy slag

j) Total solids by weight : 50 percent, *Min*

k) Pigment by weight : 25 percent, *Min*

m) Weight per litre : 1.3 kg, *Min*

n) Specific gravity : 1.32, *Min*

NOTE — The pigment should contain some acceptable and proven anti-corrosive properties suitable to retard the corrosion of ferrous alloys. The primer shall have good compatibility with the finish coat to be applied.

## 8 INSPECTION FOR DAMAGE

**8.1** The refurbishment contractor shall inspect the container again after abrasive blasting to see whether any additional damage has become visible. Extensive damage after abrasive blasting may result in scrapping of the unit. Hence, the owner should be apprised in this respect as he may like to reject the container at this stage.

### 8.2 Post Prime Repairs

Upon receipt of owner approval to proceed with the repairs, the refurbishment contractor should repair the container in accordance with the latest edition of the IICL (Institute of International Container Lessors) repair manual for steel freight containers.

**8.2.1** On completion of the additional repairs, the effected area should be re-cleaned by abrasive basting, disc/sanding or power wire brushing and reprimed with approved primer.

**8.2.2** Reprimed area larger than 1 000 $cm^2$ must be spray painted with airless or conventional painting equipment.

## 9 FINISH (TOP) COAT

The top or finish coat shall be applied as follows:

a) Application : By means of airless or conventional spray equipment or 'brush or rollers' for small areas

  i) Application temperature : 4°C to 38°C

  ii) Appearance when dry : Gloss not to exceed a reading of 35-55 at 60° specular gloss

  iii) Touch dry time : 5 h at 16°C and 50 percent relative humidity

  iv) Flash Point closed cup : Not under 29°C

  v) Shelf life : 9 months, *Min*

vi) Pot life : Up to 12 h at 27°C

vii) Weldability : A dry film on the material should be suitable for being welded without emission of toxic fumes and without the formation of heavy slag

b) Composition

i) Total solid by weight : 55 percent, *Min*

ii) Pigment by weight : 30 percent, *Min*

iii) Weight per litre : 1.3 kg, *Min*

iv) Specific gravity : 1.32

## 10 PAINT DRYING

After each application of primer or top coat, the paint must dry in accordance with the paint manufacturer's recommendations. Forced drying times and temperatures specified by the paint manufacturer should be adhered to when oven is used. When oven is not available, containers should be air-dried under a covered area till dry to touch. After that hard drying could proceed in open area.

## 11 UNDER COATING

Undercarriage of the entire base structure (Cross members, flooring, interior of bottom side rails and interior of bottom front and rear sills) of the container should be coated with water repellant Bituminous paint to get minimum D.F.T.(Dry Film Thickness) to 250 microns or as required by the owner of the container.

## 12 CLEANING AND RE-MARKING

### 12.1 Inside Cleaning

On completion of all exterior painting and after drying, all residual grit and dry paint should be properly removed.

### 12.2 Re-marking

After the last top coat of paint has dried, the identifying marks should be replaced on the container as directed by the owner. All the re-marking should be according to the original markings.

## 13 QUALITY CONTROL

The refurbishment contractor shall be responsible for maintaining quality control during the refurbishment process. Measurements shall be taken of the wet film thickness (W.F.T) of the primer and finish coats. Likewise dry film thickness (D.F.T) will be checked after the containers are dried. A proper records should be maintained by the contractor.

## 14 PAINT COATING

Painting done on the container should be as per requirement of the owner and should withstand the tests specified.

### 14.1 Resistance to Humidity

The test shall be conducted in accordance with IS 101 (Part 6/Sec 1). The metal surface shall show no sign of corrosion after the paint film is removed.

### 14.2 Artificial Sea Water Spray Test

The test shall be conducted in accordance with IS 101 (Part 6/Sec 1). The metal surface shall show no sign of corrosion after the paint film is removed.

### 14.3 Hardness Test

Pencil hardness test as per IS 101 (Part 5/Sec 1) shall be carried out, when 3 h (*Min*) pencil is used, no such scratch as to show the bare metal shall surface.

### 14.4 Flexibility and Adhesion

The test shall be conducted as per IS 101 (Part 5/Sec 2).

### 14.5 Impact Resistance Test

The test shall be conducted as per IS 101 (Part 5/Sec 3). There shall be no loss of adhesion or removal of paint film.

### 14.6 Accelerated Weathering Test

The test shall be conducted in accordance with IS 101 (Part 6/Sec 5).

### 14.7 Physical Tests

Quality of paint should be tested in a laboratory, which should prepare the surface of test panels, apply and dry the paint coatings according to IS 101 (Part 1/Sec 3) and the paint manufacturers recommendations.

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-122 BIS/ND/07

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